

CLAIMS

1. A method of monitoring the status of one or more network elements (NEs) linked together in a telecommunication network, comprising receiving a down status notification from a NE in the network, identifying one or more other NEs which are linked to the NE, polling the or each other NE to determine the status thereof.
2. A method according to claim 1 in which the status of a NE is operational i.e. up.
3. A method according to claim 1 in which the status of a NE is non-operational i.e. down.
4. A method according to any preceding claim in which a down status notification is received from a NE if the NE determines that the status of any other NE linked thereto is down.
5. A method according to claim 4 in which each NE polls the or each other NE linked thereto to determine the status of the other NE.
6. A method according to claim 5 in which each NE polls the or each other NE linked thereto by signalling to the other NE, using a signalling protocol.

7. A method according to claim 5 or claim 6 in which, if the or each other NE replies, its status is considered to be up.
8. A method according to claim 5 or claim 6 in which, if the or each other NE does not reply, its status is considered to be down.
9. A method according to any preceding claim in which the down status notification contains information on the NE which has output the notification.
10. A method according to any preceding claim in which a down status notification is received from a NE if the NE determines that the status of an interface thereof linked to one or more other NEs is down.
11. A method according to claim 10 in which the status of an interface is down if the status of the or any of the other NEs linked to the interface is down.
12. A method according to claim 10 or claim 11 in which the down status notification contains information on the NE which has output the notification, and information on the or each interface of the NE which is down.

13. A method according to any of claims 10 to 12 in which the or each interface comprises a hardware port, and the down status notification comprises a hardware port down trap.
14. A method according to any preceding claim in which the down status notification is received using a signalling protocol.
15. A method according to claim 14 in which signalling protocol comprises the simple network management protocol (SNMP).
16. A method according to any preceding claim in which identifying the or each other NE comprises accessing the down status notification to obtain information on the NE which has output the notification.
17. A method according to claim 16 in which identifying the or each other NE comprises accessing a links database containing details of each NE and the or each other NE linked thereto, and using the information to obtain the identification of the or each other NE.
18. A method according to claim 17 in which identifying the or each other NE comprises accessing the links database and using the information to obtain the IP address of the or each other NE.

19. A method according to any preceding claim in which polling the or each other NE comprises sending at least one SNMP get request to the NE.
20. A method according to claim 19 in which polling the or each other NE comprises using the SNMP over transmission control protocol/internet protocol (TCP/IP).
21. A method according to any preceding claim which comprises using a network management system (NMS) of the telecommunication network.
22. A method according to claim 20 in which the NMS comprises a fault manager module.
23. A method according to claim 22 in which the fault manager module receives the down status notification from the NE.
24. A method according to claim 23 in which the fault manager module places the down status notification in a notification database of the NMS.
25. A method according to claim 23 or claim 24 in which the fault manager module outputs a message on receipt of a down status notification.
26. A method according to any of claims 20 to 25 in which the NMS comprises a monitoring module.

27. A method according to claim 26 in which the monitoring module receives a message output from the fault manager module when it receives a down status notification.
28. A method according to 26 or claim 27 in which the monitoring module accesses the down status notification, to obtain information on the NE which has output the notification.
29. A method according to claim 28 in which the monitoring module accesses a links database of the NMS containing details of each NE and the or each other NE linked thereto, and use the information to obtain the identification of the or each other NE.
30. A method according to any of claims 26 to 29 in which the monitoring module polls the or each other NE to determine the status thereof.
31. A method according to any of claims 26 to 30 in which the monitoring module determines the status of the or each or some of the NEs of the network, and adds the status information to a status database of the NMS.
32. A method according to any of claims 20 to 32 in which the NMS comprises a graphical user interface (GUI) module.

33. A method according to claim 32 in which the GUI is used to report the status of one or more NEs of the network to a customer of the network.
34. A method according to any preceding claim in which the network elements in the telecommunication network comprise nodes, switches or routers.
35. A computer program product for monitoring the status of one or more network elements (NEs) linked together in a telecommunication network, comprising  
computer readable program means for receiving a down status notification from a NE of the network,  
computer readable program means for identifying one or more other NEs which are linked to the NE,  
computer readable program means for polling the or each other NE to determine the status thereof.
36. A computer program product according to claim 35 comprised in a network management system (NMS) of the telecommunication network.
37. A computer program product according to claim 35 or claim 36 in which the computer readable program means for receiving a down status notification from a NE of the network comprises a fault manager module of the NMS.

38. A computer program product according to any of claims 35 to 37 in which the computer readable program means for identifying one or more other NEs which are linked to the NE comprise a monitoring module of the NMS.
39. A computer program product according to any of claims 35 to 38 in which the computer readable program means for polling the or each other NE to determine the status thereof comprises the monitoring module of the NMS.
40. A computer system in which the status of one or more network elements (NEs) linked together in a telecommunication network are monitored, comprising  
receiving means for receiving a down status notification from a NE of the network,  
identification means for identifying one or more other NEs which are linked to the NE,  
polling means for polling the or each other NE to determine the status thereof.
41. A computer system whose operation is directed by the computer program product according to the any of claims 35 to 39.

42. A computer readable medium on which is stored a computer program of instructions for a computer system which monitors the status of one or more network elements (NEs) linked together in a telecommunication network, comprising
- means for receiving a down status notification from a NE of the network,
- means for identifying one or more other NEs which are linked to the NE,
- means for polling the or each other NE to determine the status thereof.
43. A program storage device readable by a machine and encoding a program of instructions for executing the method according to any of claims 1 to 34.